

# CURRICULUM VITAE

## Dr. MICHAEL (MISHA) CHERTKOV

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### PERSONAL

**Born:** September 20, 1967, Moscow, USSR  
**Nationality:** Israel, Russia  
**Marital status:** married, 2 sons (born 1989,1993)  
**Languages:** Russian, English, Hebrew

### EDUCATION

1996 Ph.D. Physics, Weizmann Institute of Science  
1990 M.Sc. Physics, Novosibirsk State University

### EMPLOYMENT

2002- Technical Staff Member, Theoretical Division, Los Alamos NL  
1999-2001 J.R. Oppenheimer Fellow, Theoretical Division, Los Alamos NL  
1996-99 R.H. Dicke Fellow, Department of Physics, Princeton University  
1993-96 Research Assistant, Weizmann Institute of Science  
1990-92 Junior Researcher, Budker Institute, Novosibirsk

### CONSULTING

1996-99 Bell Laboratories, Lucent Technologies

### AWARDS

1999 J.R. Oppenheimer Fellowship at LANL  
1996 R.H. Dicke Fellowship at Princeton  
1996 Prize of the Feinberg Graduate School  
1995 Prize of the Charles Clore Israel Foundation

### WORKSHOPS and SEMINAR SERIES ORGANIZED

03/2002 Workshop on Progress in Statistical Hydrodynamics, CNLS (LANL)  
2001- Statistical Physics Informal Seminar, CNLS (LANL)  
03/2001 Workshop on Statistical Physics of Fiber Optics Communiactions, CNLS (LANL)  
1999-2000 Theoretical Physics Seminar, CNLS (LANL)  
1997-1999 Turbulence Theory Seminar, IAS (Princeton)

### INVITED PRESENTATIONS at CONFERENCES and WORKSHOPS

08/2003 "Dynamical Chaos in Classical and Quantum Physics", Novosibirsk  
05/2003 SIAM Annual Meeting, Utah  
03/2003 Conference on Turbulence, IAS, Princeton  
02/2003 Los Alamos-Arizona Days, Tucson  
06/2002 Landau Days, Moscow  
06/2002 Program on Developed Turbulence, Vienna  
11/2001 AMS Meeting, Irvine  
06/2001 Fronts in Scalar and Vector Geophysical Workshop, NCAR, Boulder  
05/2001 Workshop on Active Chaotic Flows, LANL  
11/2000 Workshop on Theoretical Physics, Cuernavaca  
07/2000 JASON Committee on Drag Reduction, General Atomics, San Diego  
01-06/2000 Workshop on Fluid Turbulence, ITP Santa-Barbara  
11/1999 IUTAM Symposium on Geometry and Statistics of Turbulence, Kanagawa  
10/1999 AMS Meeting, Charlotte  
09/1999 Transport processes in the Atmosphere and the Ocean, Palma de Mallorca  
06/1999 Fifth workshop on Burgers Turbulence (and beyond), Nice  
05/1998 Turbulence'98, Los Alamos  
04/1998 Transport processes in the Atmosphere and the Ocean, Porto  
03/1998 APS March Meeting, Los Angeles  
06/1997 International Congress of Mathematical Physics, Brisbane  
03/1997 Workshop on Turbulence, IHES, Bur sur Yvette

**REFEREE FOR:**

Phys.Rev.E, Phys.Rev.Lett., Phys.Fluids, Euro.Phys.Lett, Physica D, JOSA B, JFM, Phys. Lett. A.

**FIELDS OF INTEREST:**

Statistical Hydrodynamics (Turbulence), Statistical and Nonlinear Optics, Combustion,  
Geophysical Fluid Mechanics, Soft Condensed Matter, Quantum magnetism

**REFEREE LIST:**

1. Prof. G. Falkovich,  
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Department of Physics and Astronomy Rutgers, The State University of New Jersey, 136 Frelinghuysen Road, Piscataway, NJ 08854-8019 USA

# List of Publications

1. The motion of a phase transition front in deep metastability, Sow. Solid. State **32**, 287 (1990), Co-author: A.Z.Patashinski.
2. The supersonic motion of a phase transition front, Sow. Solid. State **32**, 550 (1990), Co-author: A.Z.Patashinski.
3. High-temperature phase of the 2D Coulomb gas model near the Kosterlitz- Thouless phase transition, Phys. Lett.A **162**, 402(1992).
4. Functional integral and effective Hamiltonian t-J-V model of strongly correlated electron system, J. of Stat. Phys. **69**, 231 (1992), Co-author: V.I. Belinicher.
5. Long-time dynamics of the infinite-temperature Heisenberg magnet, Phys.Rev.B **49**, 3592 (1994), Co-author: I. Kolokolov.
6. Structural instability of two-dimensional turbulence, Physica D **78**, 11 (1994), Co-author: G. Falkovich.
7. Passive scalar convection in a 2D long-range delta-correlated velocity field: exact results, Journ. of Phys.A **27**, 4925 (1994), Co-authors: Y. V. Fyodorov and I. Kolokolov.
8. Statistics of a passive scalar advected by a large-scale 2D velocity field: analytic solution, Phys.Rev.E **51**, 5609 (1995), Co-authors: G. Falkovich, I. Kolokolov and V. Lebedev.
9. Equilibrium dynamics of a paramagnet cluster, Phys.Rev.B **51**, 3974 (1995), Co-author: I. Kolokolov.
10. Exact field-theoretical description of passive scalar convection in N-dimensional long-range velocity field, Phys.Lett.A **192**, 435 (1994), Co-authors: A. Gamba and I. Kolokolov.
11. Equilibrium and nonequilibrium mean-field dynamics of quantum spin cluster., Sov.Phys.JETP **79**, 824 (1994), Co-author: I. Kolokolov.
12. Normal and anomalous scaling of the fourth-order correlation function of a randomly advected passive scalar, Phys.Rev.E **52**, 4924 (1995), chao-dyn/9503001. Co-authors: G. Falkovich, I. Kolokolov, and V. Lebedev.
13. The fourth-order correlation function of a randomly advected passive scalar, JETP Lett **61**, 1012 (1995), chao-dyn/9508002, Co-authors: E. Balkovsky, I. Kolokolov, and V. Lebedev.
14. Theory of random advection in two dimensions, Int.J.Mod.Phys.B **10**, 2273 (1996), Co-authors: G. Falkovich, I. Kolokolov, and V. Lebedev.
15. Anomalous scaling exponents of a white-advedted passive scalar, Phys.Rev.Lett. **76**, 2706 (1996), chao-dyn/9509007, Co-author: G. Falkovich.
16. Non-universality of the scaling exponents of a passive scalar convected by a random flow, Phys.Rev.Lett. **76**, 3707 (1996), chao-dyn/9601016, Co-authors: G. Falkovich, and V. Lebedev.
17. Instanton for random advection, chao-dyn/9606011, Phys. Rev. E **55**, 2722 (1997).
18. Inverse cascade and intermittency of passive scalar in 1d smooth flow, chao-dyn/9706017, Phys.Rev.E **56**, 5483 (1997), Co-authors: I. Kolokolov, and M. Vergassola.
19. Inverse versus direct cascades in turbulent advection, chao-dyn/9706016, Phys.Rev.Lett. **80**, 512 (1998), Co-authors: I. Kolokolov, and M. Vergassola.
20. Intermittent dissipation of a passive scalar in turbulence, chao-dyn/9709005, Phys.Rev.Lett. **80**, 2121 (1998), Co-authors: G. Falkovich, and I. Kolokolov.
21. Propagation of a Huygens front through turbulent medium, chao-dyn/9709028, Phys.Rev.Lett. **80**, 2837 (1998), Co-author: V. Yakhot.
22. On how a joint interaction of two innocent partners (smooth advection & linear damping) produces a strong intermittency, chao-dyn/9803007, Phys. Fluids**10**, 3017 (1998).
23. Passive advection in nonlinear medium, chao-dyn/9809010, Physics of Fluids 11, 2257 (1999).
24. Lagrangian Tetrad Dynamics and Phenomenology of Turbulence, Physics of Fluids**11**, 2394 (1999), Co-authors: A. Pumir, and B. Shraiman.
25. Small-scale turbulent dynamo, chao-dyn/9906030, Phys.Rev.Lett.**83**, 4065 (1999), co-authors: G. Falkovich, I. Kolokolov and M. Vergassola.
26. Polymer Stretching by Turbulence, chao-dyn/9911011, Phys.Rev.Lett.**84**, 4761 (2000).
27. Turbulence in Polymer Solutions, Proceedings of IUTAM 99 symposium on Geometry and Statistics of Turbulence, editors T. Kambe, T. Nakano and T. Miyauchi, Fluid Mechanics and Its application Bookseries, ISBN 0-7923-6711-1, Kluwer Academic Publisher, 2001.
28. Geometry of Lagrangian Dispersion in Turbulence, Phys.Rev.Lett.**85**, 5324 (2000), co-authors: A. Pumir, B. Shraiman.
29. The Lagrangian view of energy transfer in turbulent flow, Euro.Phys.Lett.**56**, 379 (2001), co-authors: A. Pumir, B. Shraiman.

30. Pulse confinement in optical fibers with random dispersion, nlin.CD/0011043, Proc. Natl. Acad. Sci. USA **98**, 14208 (2001), co-authors: I. Gabitov, J. Moeser.
31. Shedding and Interaction of Solitons in Imperfect Medium, Pis'ma v ZhETF **74**, 391 (2001) [JETP Letters **74**, 357 (2001)], co-authors: I. Gabitov, I.Kolokolov, V. Lebedev.
32. Solitons in Optical Medium with Disorder and Anisotropy, Pis'ma v ZhETF **74**, 608 (2001), co-authors: I. Gabitov, I.Kolokolov, V. Lebedev.
33. Pinning method of pulse confinement in optical fiber with random dispersion, JOSA B 19, 2538 (2002), co-authors: I. Gabitov, P. Lushnikov, J. Moeser, Z. Toroczkai.
34. Decay of scalar turbulence revisited, Phys.Rev.Lett **90**, 034501 (2003), co-author: V. Lebedev.
35. Acceleration of chemical reaction by chaotic mixing, to appear in Phys.Rev.Lett, nlin.CD/0301037, co-author: V. Lebedev.
36. Shedding and interaction of solitons in weakly disordered optical fibers, to appear in PRE, co-authors: Y. Chung, A. Dyachenko, I. Gabitov, I. Kolokolov, and V. Lebedev.
37. Inelastic collisions of pulses in optical fibers, submitted to JOSA B 09/2002, co-authors: A.Peleg and I. Gabitov.
38. Inter-channel interaction of optical solitons, submitted to PRE 11/2002, co-authors: A. Peleg and I. Gabitov.
39. Passive Compensation of Polarization Mode Dispersion via Periodic Control (Pinning) of Birefringent Disorder, submitted to JOSA B 11/2002, co-authors: I. Gabitov, I. Kolokolov and T. Schäfer.
40. Probability of anomalously large Bit-Error-Rate in long haul optical transmission, submitted to Phys.Rev.Lett., <http://arXiv.org/abs/cond-mat/0303073>, co-authors: Vladimir Chernyak, Igor Kolokolov, and Vladimir Lebedev.
41. Extreme Outages due to Polarization Mode Dispersion, submitted to Optics. Lett., <http://arXiv.org/abs/physics/0303013>, co-authors: Vladimir Chernyak, Igor Kolokolov, and Vladimir Lebedev.
42. Compensation for Extreme Outages caused by Polarization Mode Dispersion and Amplifier noise, submitted to Optics. Express., <http://arXiv.org/abs/physics/0303014>, co-authors: Vladimir Chernyak, Igor Kolokolov, and Vladimir Lebedev.
43. Periodic and Quasi-Periodic Compensation Strategies of Extreme Outages caused by Polarization Mode Dispersion and Amplifier Noise, submitted to IEEE Phot. Techn. Lett., <http://arXiv.org/abs/physics/0303015>, co-authors: Vladimir Chernyak, Igor Kolokolov, and Vladimir Lebedev.